

Part Number: 8998202021  
Frequency Range: Dimensions  
Description: 98 EFD CORE  
Application: Inductive Components  
Where Used: Closed Magnetic Circuit  
Part Type: EFD Cores  
Generic Name: EFD20

## Mechanical Specifications

Weight: 7.000 (g)

## Part Type Information

EFD10, EFD12, EFD15, EFD20, EFD25, EFD30

EFD (Economical Flat Design) cores have been designed to maximize volume in a low profile geometry. EFD cores allow maximum throughput power density with reasonably low mass for board level installation.

- EFD cores can be supplied with the centerpost gapped to a mechanical dimension.
- EFD cores can also be supplied to an AL value, these would be supplied in sets.



## Mechanical Specifications

Dim	mm	mm tol	nominal inch	inch misc.
A	20.00	± 0.55	0.787	-
B	10.00	± 0.25	0.394	-
C	6.65	± 0.2	0.262	-
D	7.70	± 0.25	0.303	-
E	15.40	± 0.5	0.606	-
F	8.90	± 0.3	0.350	-
G	-	-	-	-
H	-	-	-	-
J	-	-	-	-
K	3.60	± 0.15	0.142	-

## Electrical Specifications

Typical Impedance ( $\Omega$ )	
Electrical Properties	
$A_L$ (nH)	1200 ±25%
$A_e$ (cm <sup>2</sup> )	0.31000
$\sum I/A$ (cm <sup>-1</sup> )	15.60
$l_e$ (cm)	4.74
$V_e$ (cm <sup>3</sup> )	1.44000
$A_{min}$ (cm <sup>2</sup> )	.290

### Legend

+ Test frequency

Preferred parts, the suggested choice for new designs, have shorter lead times and are more readily available.

The column H(Oe) gives for each bead the calculated dc bias field in oersted for 1 turn and 1 ampere direct current. The actual dc H field in the application is this value of H times the actual NI (ampere-turn) product. For the effect of the dc bias on the impedance of the bead material, see figures 18-23 in the application note How to choose Ferrite Components for EMI Suppression.

A ½ turn is defined as a single pass through a hole.

$\sum I/A$  - Core Constant

$A_e$  - Effective Cross-Sectional Area

$A_L$  - Inductance Factor ( $\frac{L}{N^2}$ )

N/AWG - Number of Turns/Wire Size for Test Coil

$l_e$  - Effective Path Length

$V_e$  - Effective Core Volume

NI - Value of dc Ampere-turns

## Land Patterns

V	W ref	X	Y	Z
-	-	-	-	-
-	-	-	-	-

## Winding Information

Turns	Wire	1st Wire	2nd Wire
Tested	Size	Length	Length
-	-	-	-

## Reel Information

Tape Width	Pitch	Parts 7 "	Parts 13 "	Parts 14 "
mm	mm	Reel	Reel	Reel
-	-	-	-	-

## Package Size

Pkg Size
-
(-)

## Connector Plate

# Holes	# Rows
-	-



## Ferrite Material Constants

Specific Heat .....	0.25 cal/g/°C
Thermal Conductivity .....	10x10 <sup>-3</sup> cal/sec/cm/°C
Coefficient of Linear Expansion .....	8 - 10x10 <sup>-6</sup> /°C
Tensile Strength .....	4.9 kgf/mm <sup>2</sup>
Compressive Strength .....	42 kgf/mm <sup>2</sup>
Young's Modulus .....	15x10 <sup>3</sup> kgf/mm <sup>2</sup>
Hardness (Knoop) .....	650
Specific Gravity .....	≈ 4.7 g/cm <sup>3</sup>

*The above quoted properties are typical for Fair-Rite MnZn and NiZn ferrites.*

See next page for further material specifications.



A low loss MnZn ferrite material for power applications up to 200kHz.

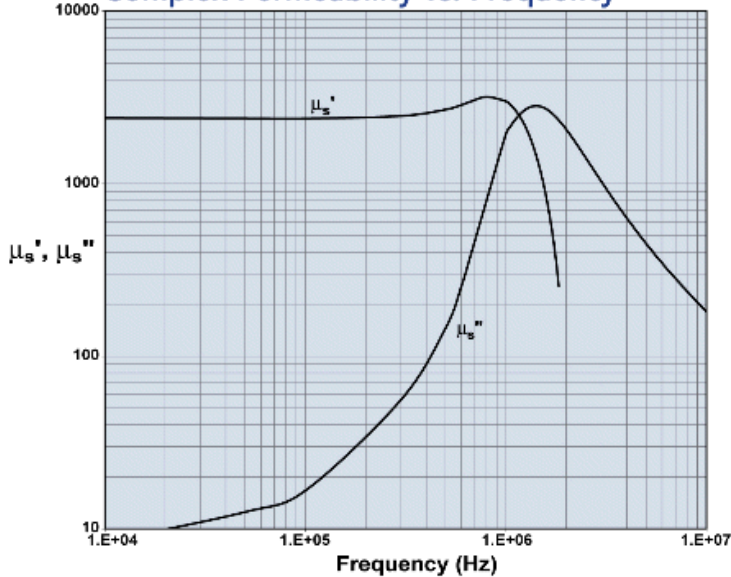
New type 98 Material is an improved version of Fair-Rite's 78 Material, this material supplies lower power loss at 100°C at moderate flux densities for operation below 200kHz.

Shapes available in 98 material are Toroids, U Cores, E&I Cores, Pot Cores, RM, PQ, ETD, EFD, EP, EER.

### 98 Material Characteristics

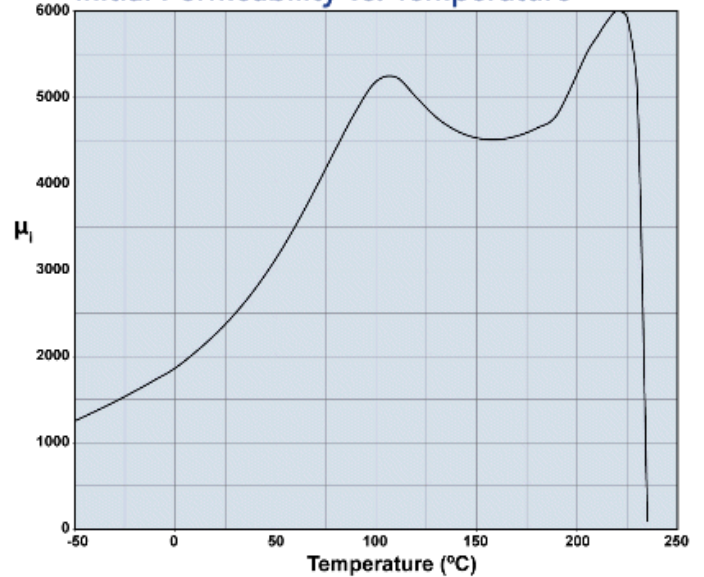
Property	Unit	Symbol	Value
Initial Permeability @ B < 10gauss		$\mu_i$	2400
Flux Density @ Field Strength	gauss oersted	B H	5000 5
Residual Flux Density	gauss	$B_r$	1800
Coercive Force	oersted	$H_c$	0.17
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan\delta/\mu_i$	3.5 0.1
Temperature Factor of Initial Permeability (25 - 60°C)	$10^{-8}/^\circ\text{C}$		5.8
Curie Temperature	°C	$T_c$	> 215
Resistivity	ohm-cm	$\rho$	200

**Complex Permeability vs. Frequency**



Measured on an 18/10/6mm toroid using HP 4284A and HP 4291A.

**Initial Permeability vs. Temperature**

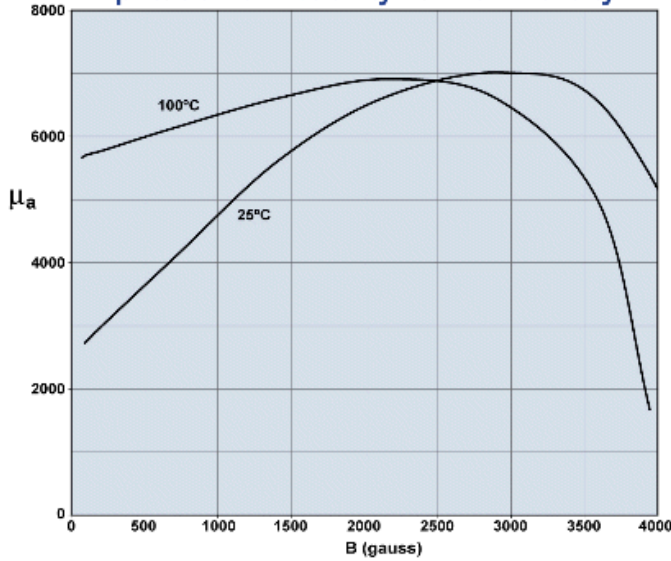


Measured on an 18/10/6mm toroid at 10kHz.



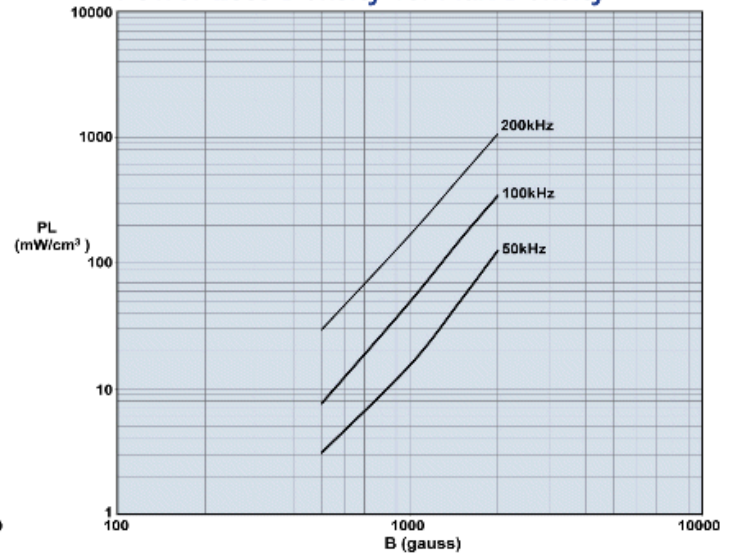
A low loss MnZn ferrite material for power applications up to 200kHz.

**Amplitude Permeability vs. Flux Density**



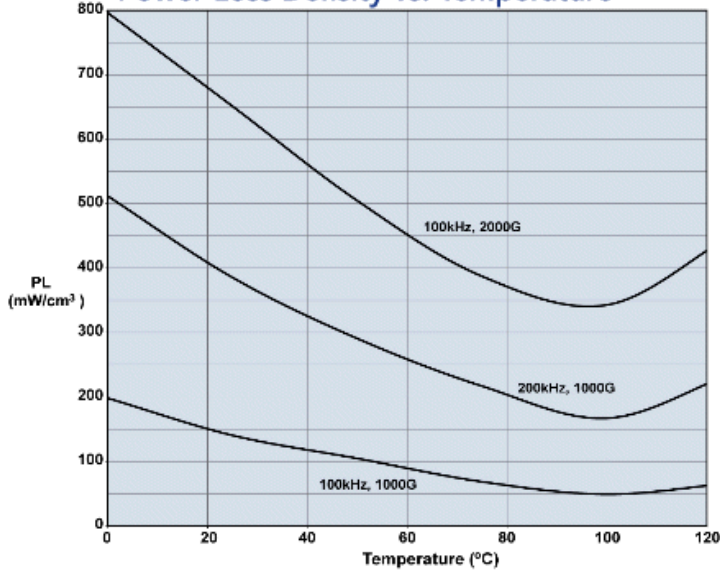
Measured on an 18/10/6mm toroid at 10kHz.

**Power Loss Density vs. Flux Density**



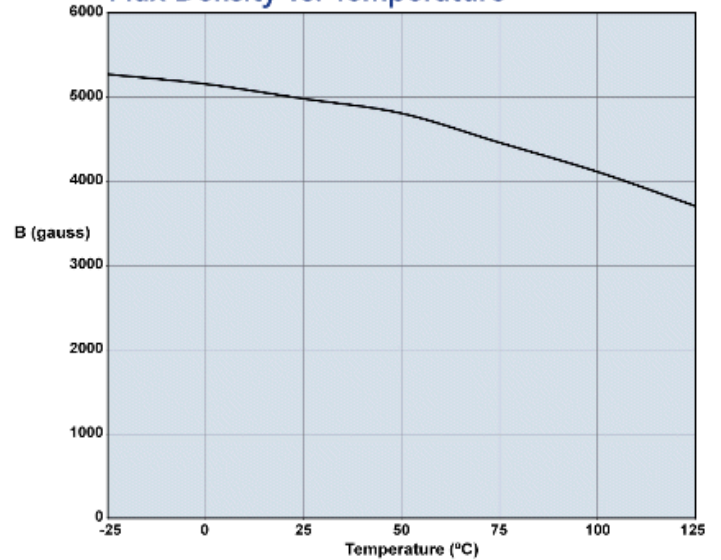
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C.

**Power Loss Density vs. Temperature**



Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW.

**Flux Density vs. Temperature**



Measured on an 18/10/6mm toroid at 10kHz and H=5 oersted.